

Risk Factors for Acute-Level Hospital Course in Pediatric Craniofacial Fractures: A Decade in Review of the National Trauma Data Bank



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INTRODUCTION

- Pediatric craniofacial fractures represent 11.3% of all pediatric emergency department visits.^{1,2}
 - Can be associated with significant morbidity and mortality.^{1,3-6}

Proximity to vital structures

Financial Burden

Emotional Burden

Management of Pediatric Craniofacial Fractures can be Challenging

Growing craniofacial skeleton

- Literature on adult craniofacial fractures is abundant but the **pediatric age group remains relatively understudied.**
- Given the underreporting of traumatic brain injuries (TBIs), prevalence of concomitant injuries and increased risk of mortality, there is **a need for research that can aid in prompt recognition of high-risk cases** for acute level hospital course.^{3, 7-9}

PURPOSE

Identify **risk factors** for an **acute-level hospital course** during the trauma admission for pediatric craniofacial fractures using the largest cohort to date.

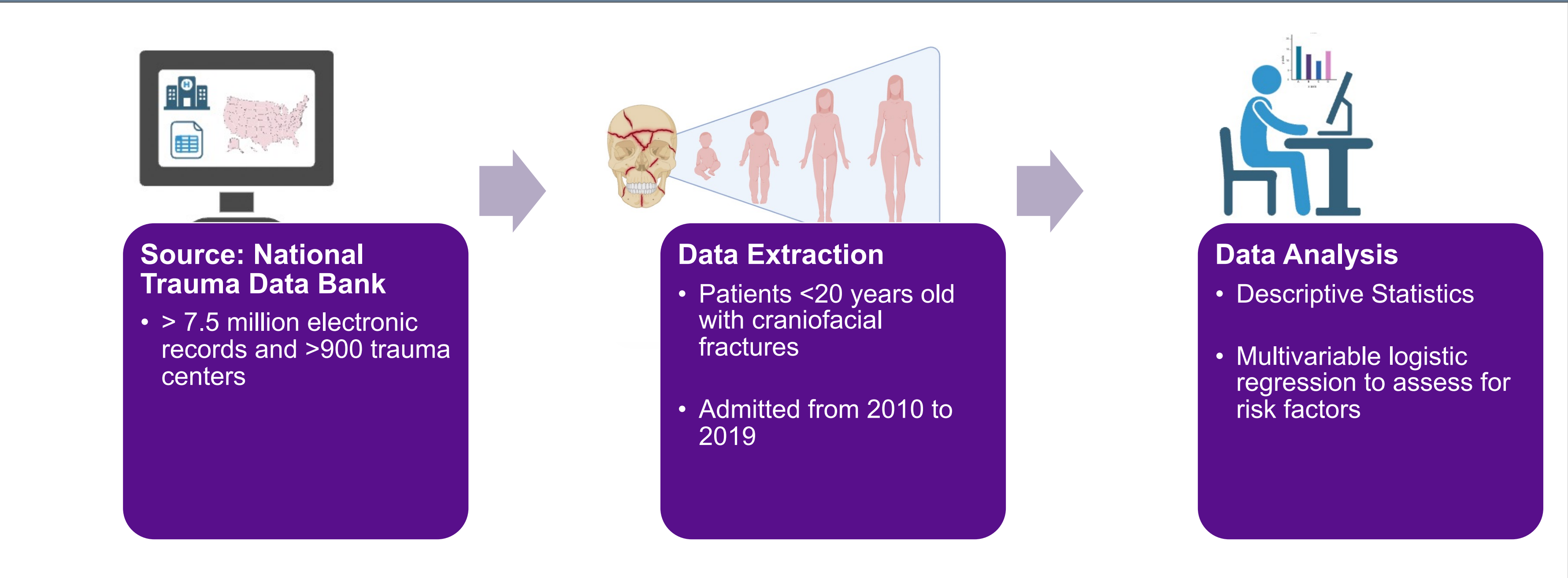
Craniofacial Fractures

Cranial VaultMandibleMidfaceOrbital Floor

Outcomes

ICU AdmissionTracheostomyC-spine fractureIntracranial Injury

METHOD

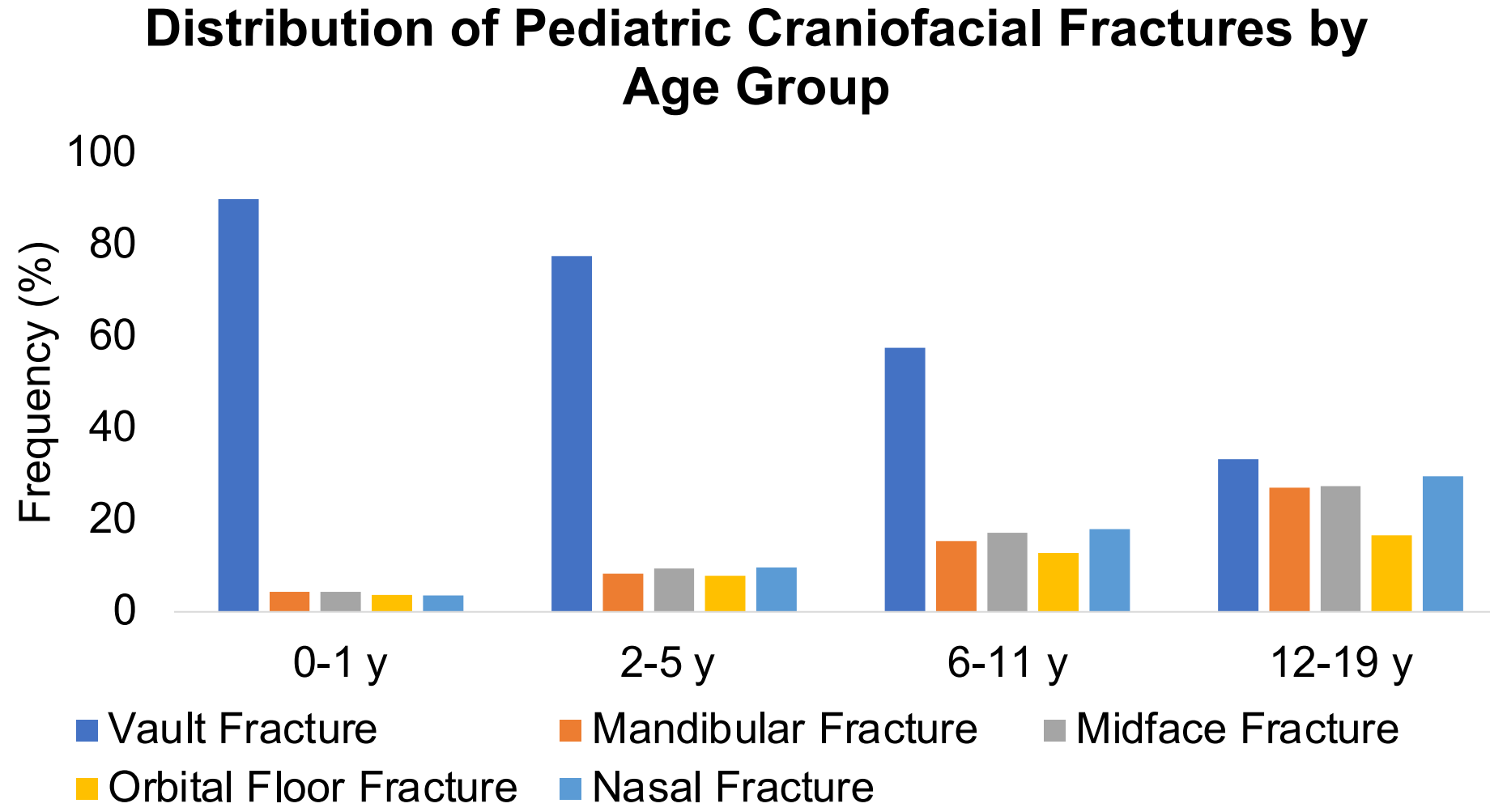


RESULTS

Epidemiology:

- A **total of 155, 136 patients** with pediatric craniofacial fractures identified.
- Most were *White, Males* and in the 12-19 year old age group.
- Increasing age: ↓ cranial vault fractures and ↑ facial fractures
- Midface and orbital floor fractures occurred more commonly as multi-craniofacial fractures.

Distribution of Pediatric Craniofacial Fractures by Age Group



Aim 1: Among isolated craniofacial fractures, which fracture has the highest risk of outcomes associated with acute-level hospital course?

- Adjusting for age, sex, race, mechanism of injury, Abbreviated injury scale (AIS), and Glasgow Coma scale (GCS) score when relevant.

	Risk for ICU admission			Risk for Intracranial Injury			Risk for Tracheostomy			Risk for C-Spine Fracture		
	Variable	P-value	Odds Ratio	Variable	P-value	Odds Ratio	Variable	P-value	Odds Ratio	Variable	P-value	Odds Ratio
Isolated Fractures	Orbital Floor Fx (ref)			Orbital Floor Fx (ref)			Orbital Floor Fx (ref)			Orbital Floor Fx (ref)		
	Vault Fx	<0.001	3.390	Vault Fx	<0.001	2.731	Vault Fx	NS	-	Vault Fx	NS	-
	Mandible Fx	NS	-	Mandible Fx	NS	-	Mandible Fx	<0.001	3.433	Mandible Fx	<0.001	1.775
	Midface Fx	<0.001	1.464	Midface Fx	<0.001	1.203	Midface Fx	<0.001	2.082	Midface Fx	<0.001	1.529

RESULTS

Aim 2: What patient and injury-related factors increase the risk for these outcomes further?

- We assessed the following variables: age group, sex, race, mechanism of injury, AIS score, GCS score and presence of multi-craniofacial fracture.

Among Vault Fractures

	Variable	P-value	Odds Ratio
Age Group	0-1 year (ref)		
	2-5 years	<0.01	1.553
	6-11 years	<0.01	2.411
	12-19 years	<0.01	3.040
Race	White (ref)		
	Asian	<0.01	1.206
	Hispanic	<0.01	2.705
	Multi-racial	<0.01	2.304
	AIS score	<0.01	1.294

Among Mandibular Fractures

	Variable	P-value	Odds Ratio
Age Group	0-1 year (ref)		
	12-19 years	0.04	1.919
	MVT (ref)		
Mechanism	Firearm	<0.01	4.051
	Multi-Craniofacial Fx	<0.01	2.070
	AIS score	<0.01	1.132

Tracheostomy

	Variable	P-value	Odds Ratio
Age Group	0-1 year (ref)		
	12-19 years	0.04	1.919
	MVT (ref)		
Mechanism	Firearm	<0.01	1.718
	AIS score	<0.01	1.189

C-spine Fracture

	Variable	P-value	Odds Ratio
Age Group	0-1 year (ref)		
	12-19 years	0.04	1.919
	MVT (ref)		
Mechanism	Firearm	<0.01	1.718
	AIS score	<0.01	1.189

Above are the statistically significant results.

CONCLUSIONS

- Using the largest cohort of pediatric craniofacial fractures to date:

 - We identified the **independent contribution of craniofacial fracture patterns to the risk of acute-level hospital course outcomes**, and identified **patient and injury-related factors** that increased the risk further.
 - By **dissecting the intricacies of risk factors** for acute-level hospital courses we aim to aid in **risk stratification**, highlight areas of **future research** and **improve patient counseling**.
 - We **addressed several limitations of prior studies** (temporal bias, small sample sizes, geographical limitations).

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